

and that the differences of intensity and quantity are quite sufficient to account for what were supposed to be their distinctive qualities.

115. The extension which the present investigations have enabled me to make of the facts and views constituting the theory of electro-chemical decomposition, will, with some other points of electrical doctrine, be almost immediately submitted to the Royal Society in another series of these Researches.

December 15, 1832.

**§ 3. ON A NEW LAW OF  
ELECTRIC CONDUCTION.  
§ 4. ON  
CONDUCTING POWER  
GENERALLY**

*§ 3. On a new Law of Electric  
Conduction*

116. IT was during the progress of investigations relating to electro-chemical decomposition, which I still have to submit to the Royal Society, that I encountered effects due to a very *general law* of electric conduction not hitherto recognised; and though they prevented me from obtaining the condition I sought for, they afforded abundant compensation for the momentary disappointment, by the new and important interest which they give to an extensive part of electrical science.

117. I was working with ice, and the solids resulting from the freezing of solutions, arranged either as barriers across a substance to be decomposed, or as the actual poles of a voltaic battery, that I might trace and catch certain elements in their transit, when I was suddenly stopped in my progress by finding that ice was in such circumstances a non-conductor of electricity; and that as soon as a thin film of it was interposed, in the circuit of a very powerful voltaic battery, the transmission of electricity was prevented, and all decomposition ceased.

118. At first the experiments were made with common ice, (luring the cold freezing weather of the latter end of January 1833; but the results were fallacious, from the imperfection

<sup>1</sup> Fourth Series, original edition, vol. i. p. no.